



In re application of  
MURAMATSU et al  
Serial No. U.S.S.N. 09/423,981  
Filed on February 18, 2000  
For: Aluminum-Alloy Based Sliding Material

DECLARATION UNDER C.F.R. 1.132

Honorable Commissioner, Patents and Trademarks  
Washington, D. C. 20231  
U.S.A.

I, Soo-Myung Hong have a residence at c/o TAIHO KOGYO CO., LTD., 65  
Midorigaoka 3-chome, Toyota-shi, AICHI 471-8502 JAPAN

I am a co-inventor of the captioned patent application and hereby declare:

THAT, I graduated on March 1975 from Master Course of Nagoya Institute  
of Technology.

THAT, I was employed on February 1, 1981 by TAIHO KOGYO CO., LTD.

THAT, I was engaged in the development of compressor-component materials  
and sliding materials .

THAT, the inventive and comparative flame-sprayed layers having a  
composition shown in Tables 1 and 2 below, were formed on a rolled aluminum-sheet  
described in Example 1 of the present English specification.

THAT, the HVOF conditions are the same as those described on page 7, lines  
7 through 13 of the present English specification.

THAT, the condition of the plasma spraying is as follows.

Distance between a gun and a work piece: 150 mm

Current/ voltage of arc: 500A/55V

Primary gas: Ar 75psi/96SCFH

Secondary gas: H<sub>2</sub> 50psi/20SCFH

1 psi = 0.07kg/cm<sup>2</sup>, SCFH = feet<sup>3</sup>/hr

THAT, the casting and forging conditions are as follows.

Melting temperature: 750°C

Temperature of metallic die: 100°C

Forging temperature of cast aluminum alloy: 350°C

Table 1 Inventive Products (Composition etc)

	Composition (%)								Production Method	Diameter of Si Particles (μm)	Surface Coating
	Al	Si	S n	Cu	Mg	Mn	Fe	Ni			
1	Bal	40	-	-	-	-	-	-	HVOF	13	-
1'	Bal	40	-	2	0.5	0.5	-	-	↑	21	-
2	Bal	35	10	-	-	-	-	-	↑	12	-
2'	Bal	35	10	-	-	-	-	-	↑	27	-
3	Bal	49	-	2.8	0.7	0.5	0.7	-	↑	15	-
3'	Bal	49	-	2.8	0.7	0.5	0.7	-	↑	32	-
4	Bal	21.7	30	4.3	-	-	-	2.2	↑	10	-
5	Bal	17	-	2	1	-	-	-	↑	10	-
6	Bal	40	-	-	-	-	-	-	↑	13	Lubricating film
7	Bal	40	-	-	-	-	-	-	↑	13	Sn plating

Table 2 Comparative Products (Composition etc)

	Composition (%)								Production Method	Diameter of Si Particles (μm)	Surface Coating
	Al	Si	S-	Cu	Mg	Mn	Fe	Ni			
(1)	100	-	-	-	-	-	-	-	HVOF	-	-
(2)	Bal	17	-	-	-	-	-	-	Casting and Forging	20	-
(3)	Bal	8	-	3	1	0.5	-	1	↑	2	-
(4)	Bal	40	-	-	-	-	-	-	Plasma Spraying	0.8	-

THAT, larger ten Si particles in the cross section of 0.1 mm square of the flame-sprayed layer were measured and the average diameter of these Si particles was calculated as shown in Table 1.

THAT, the lubricating film mentioned in Table 1 is a solid-lubricant film consisting of MoS<sub>2</sub> and polyamide imide.

THAT, the wear amount and seizure load were measured by the methods described on pages 7 and 8 of the present English text, respectively, are shown in Table 3. The wear amount is that of the flame-sprayed layer. The seizure load of >150 means that it exceeds 150 kgf/mm<sup>2</sup>, that is, the maximum measurable limit of the tester.

Table 3

		Production Method	Wear Amount (depth- $\mu$ m)	Seizure Load (kg/cm <sup>2</sup> )
1	Inventive	HVOF	3	80
1'	↑	↑	1	100
2	↑	↑	2	80
2'	↑	↑	0.5	110
3	↑	↑	1	90
3'	↑	↑	0.2	110
4	↑	↑	2	80
5	↑	↑	2.5	70
6	↑	↑	0	>150
7	↑	↑	0	>150
(1)	Comparative	↑	50	40
(2)	↑	Casting and Forging	4	60
(3)	↑	↑	15	50
(4)	↑	Plasma Spraying	5	60

I, the undersigned declarant, declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and; further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001, of title 18, of the United States Code, and, that such willful false statements may jeopardize the validity of the application and any patent issuing thereon.

Signed this            day of August 2005

Soo-Myung Hong

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